Application No. 09/941,151
Amendment dated December 2, 2003
Reply to Office Action of June 2, 2003

Listing of Claims

Claims 1-48 (canceled)

49.(currently amended) A method of providing a custom orthodontic appliance
for repositioning teeth of a patient comprising:
 communicating, from an orthodontic practitioner, three-dimensional information from the
  mouth of a patient of the shapes of the teeth of the patient;
 displaying, on a computer display for inspection by a person viewing the display, images
  of the teeth of the patient in suggested tooth positions and orientations that are
  based on the three-dimensional information;
 communicating, from [[the]] a person viewing the ~~display feedback~~ display, feedback
  information regarding the suggested tooth positions and orientations toward which
  the teeth of the patient are to be moved by orthodontic treatment;
 providing a custom design of an orthodontic appliance that is configured to urge the teeth
  of the patient, when installed thereon, toward tooth positions and orientations and
  that has been manufactured based on the suggested tooth positions and
  orientations in accordance with the feedback information.

50.(currently amended) The method of claim 49 wherein:
 the person viewing the display is [[the]] an orthodontic practitioner; and
 the feedback information includes information selected from the group consisting
essentially of information of changes to the suggested tooth positions or orientations and
information approving tooth positions and orientations toward which the teeth of the patient are
to be moved by the appliance.

51.(currently amended) The method of claim 50 further comprising:
 providing the ~~orthodontic practitioner~~ person viewing the display with a computer
  interface ~~device~~ and displaying the images thereon;

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providing the computer interface with a capability for the entry by ~~the orthodontic practitioner~~ the person viewing the display of the feedback information.

52.(currently amended) The method of claim 49 wherein ~~50 further comprising~~: the feedback information includes information of changes to the suggested tooth positions or orientations;

~~if change data is entered,~~ the method further comprises redisplaying[[,]] images of the teeth in ~~revised~~ tooth positions and orientations revised in accordance with the feedback information for inspection by the ~~orthodontic practitioner~~ person viewing the display.

53.(currently amended) The method of claim 49 wherein:

the ~~three dimensional~~ three-dimensional information is derived at least in part from an impression of the teeth of the patient from the orthodontic practitioner; and

the displaying of the images of the teeth of the patient is in response to data digitized from a model of the teeth made from the impression.

54.(currently amended) The method of claim 49 further comprising:

communicating the ~~three-dimensional~~ three-dimensional information to a remote computing facility for the derivation of the suggested tooth positions and orientations from the ~~three dimensional~~ three-dimensional information; and

~~receiving from the remote computing facility~~ displaying digital images of the teeth of the patient in the suggested tooth positions and orientations ~~for the displaying thereof~~ on the computer display.

55.(currently amended) The method of claim 49 further comprising:

communicating the ~~three dimensional~~ three-dimensional information to a remote computing facility for the derivation ~~therefrom~~ of the suggested tooth positions and orientations from the ~~three dimensional~~ three-dimensional information; and

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~~receiving from the remote computing facility~~ displaying digital images of the teeth of the

patient in the suggested tooth positions and orientations ~~for the displaying thereof~~

on the computer display;

communicating, to <u>an</u> ~~a remote~~ orthodontic appliance manufacturing facility having

equipment thereat for manufacturing the custom orthodontic appliance, data that

includes three-dimensional information of the shapes of the teeth of the patient

and information regarding tooth positions and orientations toward which the teeth

of the patient are to be moved by orthodontic treatment; and

receiving from the remote orthodontic appliance manufacturing facility the custom

orthodontic appliance for providing the appliance to the orthodontic practitioner

for the treatment of the patient.

56.(previously presented) The method of claim 49 further comprising:

communicating, to a remote orthodontic appliance manufacturing facility having

equipment thereat for manufacturing the custom orthodontic appliance, data that

includes three-dimensional information of the shapes of the teeth of the patient

and information regarding tooth positions and orientations toward which the teeth

of the patient are to be moved by orthodontic treatment; and

receiving from the remote orthodontic appliance manufacturing facility the custom

orthodontic appliance for providing the appliance to the orthodontic practitioner

for the treatment of the patient.

57.(currently amended) The method of claim 49 wherein:

the feedback information includes information selected from the group consisting

essentially of information of changes to the suggested <u>tooth</u> positions or

orientations and information approving tooth positions and orientations toward

which the teeth of the patient are to be moved by the appliance;

the method further comprises:

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    providing the person viewing the display with a capability for entering <u>feedback</u>
        <u>information in the form of</u> change data from [[the]] <u>an</u> orthodontic
        practitioner into a computer indicating selected changes in the suggested
        tooth positions and orientations;
    ~~if change data is entered,~~ displaying on the computer images of the teeth in revised
        tooth positions and orientations <u>in response to the feedback information</u>.

    58.(currently amended) The method of claim 57 further comprising:
establishing a digital communications link between [[the]] <u>a</u> computer ~~display~~ <u>terminal</u>
        and a digital computer at a remote location;
transferring the three-dimensional information in digital form to the remote location;
deriving with the digital computer at the remote location the suggested tooth positions and
        orientations;
communicating digital data of the suggested tooth positions and orientations from the
        remote location to the computer display ~~over the digital communications link~~;
communicating [[the]] change data <u>from the computer display</u> to the <u>computer at the</u>
        remote location ~~over the digital communications link~~;
[[re]]calculating the revised tooth positions and orientations with the digital computer at
        the remote location in response to the change data;
communicating digital data of the revised tooth positions and orientations from the
        remote location to the computer display ~~over the digital communications link~~.

    59.(currently amended) The method of claim [[57]] <u>58</u> further comprising:
<u>entering commands accepting tooth positions and orientations at the computer display;</u>
communicating entered commands accepting tooth positions and orientations to the
        remote location ~~over the digital communications link~~; <u>and</u>
processing [[of]] the data of the accepted revised tooth positions and orientations and of
        the three-dimensional information and [[the]] designing of the custom orthodontic
        appliance with the digital computer at the remote location.

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60.(currently amended) The method of claim 59 further comprising:

transmitting data of the ~~design of the~~ designed custom orthodontic appliance from the

remote location ~~over the digital communications link~~;

displaying images of the designed custom orthodontic appliance on the computer display

in response to the transmitted data;

transmitting appliance modification data to the <u>computer at the</u> remote location and

redesigning the appliance with the digital computer at the remote location in

response to the transmitted appliance modification data.

61.(previously presented) The method of claim 49 wherein:

the custom orthodontic appliance includes positioning jigs having surfaces thereon

that conform to the shapes of the teeth of the patient.

62.(previously presented) The method of claim 49 wherein:

the custom orthodontic appliance includes positioning jigs having surfaces thereon

that conform to the shapes of the teeth of the patient; and

the method further comprises:

locating the jig on the patient with said surface conforming to the shape of

the one or more teeth,

positioning the appliance on the one or more teeth with the jig, and

bonding the appliance so positioned to the tooth.

63.(previously presented) A system for manufacturing an orthodontic appliance

comprising means, including a programmed computer, for performing the method of claim 49.

Claims 64-83 (canceled)

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84.(New) The method of claim **52** wherein:

the feedback information includes information from an orthodontic practitioner approving the revised tooth positions and orientations as those toward which the teeth of the patient are to be moved by the appliance.

85.(New) The method of claim **49** further comprising:

displaying the custom design of the orthodontic appliance on a computer display and accepting additional feedback information from a person viewing the display on which the custom design is displayed regarding the custom design.

86.(New) The method of claim **85** wherein:

the person viewing the display on which the custom design is displayed is an orthodontic practitioner; and

the additional feedback information includes information selected from the group consisting essentially of information of changes to the displayed custom design and information approving the custom appliance design.

87.(New) The method of claim **86** further comprising:
providing the person viewing the display on which the custom design is displayed with a
computer interface and displaying the custom design thereon;
providing the computer interface with a capability for the entry by the person viewing the
display on which the custom design is displayed of the additional feedback
information.

88.(New) The method of claim **85** wherein:
the additional feedback information includes information of changes to the custom
design; and
the method further comprises redisplaying the custom appliance design revised in
accordance with the additional feedback information for inspection by the person
viewing the display on which the custom design is displayed.

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        89.(New) The method of claim **85** wherein:

the additional feedback information includes information selected from the group

      consisting essentially of information of changes to the custom design and

      information approving the custom design; and

the method further comprises:

      providing the person viewing the display on which the custom design is displayed

            with a capability for entering additional feedback information in the form

            of change data from an orthodontic practitioner into a computer indicating

            selected changes in the custom design, and

      displaying on the computer images of the custom design revised in response to the

            additional feedback information.

        90.(New) The method of claim **49** further comprising:

providing a custom orthodontic appliance that is configured to urge the teeth of the

      patient, when installed thereon, toward tooth positions and orientations and that

      have been manufactured based on the suggested tooth positions and orientations in

      accordance with the feedback information.

        91.(New) A system for manufacturing an orthodontic appliance, including a

programmed computer, and comprising:

    a computer display;

    a computer programmed to receive three-dimensional information from the mouth of a

      patient of the shapes of the teeth of the patient and to display on the computer

      display, images of the teeth of the patient in suggested tooth positions and

      orientations that are based on the three-dimensional information;

    the computer being programmed to receive, from a person viewing the display, feedback

      information; and

    the system being further programmed to determine the design of a custom orthodontic

      appliance configured to move the teeth of the patient to tooth positions and

      orientations in response to the feedback information.

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92.(New) The system of claim 91 further comprising:

appliance manufacturing equipment configured to provide a custom orthodontic appliance

   having the custom appliance design.

93.(New) The system of claim 91 wherein:

   the computer is programmed to receive feedback information that includes

information selected from the group consisting essentially of information of changes to the

suggested tooth positions or orientations and information approving tooth positions and

orientations toward which the teeth of the patient are to be moved by the appliance.

94.(New) The system of claim 93 further comprising:

a computer interface configured to display the images thereon; and

the computer interface having the capability for the entry of the feedback information.

95.(New) The system of claim 91 wherein:

the computer is programmed to receive feedback information that includes information of

   changes to the suggested tooth positions or orientations;

the computer is programmed to redisplay images of the teeth in tooth positions and

   orientations revised in accordance with the feedback information.

96.(New) The system of claim 91 wherein:

the computer is programmed to receive feedback information that includes information of

   changes to the design of the appliance;

the computer is programmed to redisplay images of the teeth in tooth positions and

   orientations revised in accordance with the changes in the design of the appliance.

97.(New) The system of claim 91 wherein:

the computer is programmed to display a graphical user interface on the computer display

   through which to receive, from a person viewing the display, the feedback

   information that includes information of changes to the design of the appliance.

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   98.(New) A system for manufacturing an orthodontic appliance, including a
programmed computer, and comprising:

   a computer display;

   a computer programmed to receive three-dimensional information from the mouth of a
      patient of the shapes of the teeth of the patient and to display on the computer
      display, images of the teeth of the patient in suggested tooth positions and
      orientations that are based on the three-dimensional information;

   the computer being programmed to receive, from a person viewing the display, feedback
      information regarding the suggested tooth positions and orientations toward which
      the teeth of the patient are to be moved by orthodontic treatment; and

   the system being further programmed to display on the computer display, images of the
      teeth of the patient in suggested tooth positions and orientations that are based on
      the feedback information.

   99.(New) The system of claim 98 wherein:

   the computer is programmed to display a graphical user interface on the computer display
      through which to receive, from a person viewing the display, the feedback
      information.

   100.(New) The system of claim 99 wherein:

   the graphical user interface includes controls for enabling a person viewing the display to
      move one or more of the images of the teeth from the suggested positions and
      orientations.

   101.(New) The system of claim 99 wherein:

   the graphical user interface includes controls for enabling a person viewing the display to:
      select a tooth for which its position or orientation among the suggested tooth
         positions and orientations is to be changed;
      select a tooth position or orientation parameter to be changed for a selected tooth;
      change a selected tooth position or orientation parameter for a selected tooth; and

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cause the redisplay of images of the teeth of the patient in tooth positions and

orientations that include a changed selected tooth position or orientation of

a selected tooth.

102.(New) The system of claim 101 wherein the controls for enabling a person
viewing the display to select a tooth for which its position or orientation among the suggested
tooth positions and orientations is to be changed includes:

a screen area associated with a particular tooth that is responsive to a selection by a

pointing device.

103.(New) The system of claim 101 wherein the controls for enabling a person
viewing the display to select a tooth for which its position or orientation among the suggested
tooth positions and orientations is to be changed includes:

a plurality of screen areas, each associated with a different tooth and each responsive to a

selection by pointing thereto to select the tooth.

104.(New) The system of claim 101 wherein the controls for enabling a person
viewing the display to select a tooth position or orientation parameter to be changed includes:

a plurality of controls, one associated with each of the tooth angles of torque, tip and

rotation, for respectively selecting torque, tip and rotation angles of the tooth for

change.

105.(New) The system of claim 99 wherein the graphical user interface includes:
controls enabling a person viewing the display to select a tooth for which its position or

orientation among the suggested tooth positions and orientations is to be changed

that includes a screen area associated with a particular tooth that is responsive to a

selection by pointing thereto.

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106.(New) The system of claim 99 wherein the graphical user interface includes:
controls enabling a person viewing the display to select a tooth for which its position or
orientation among the suggested tooth positions and orientations is to be changed
that includes a plurality of screen areas, each associated with a different tooth and
each responsive to a selection by pointing thereto to select the tooth.

107.(New) The system of claim 99 wherein the graphical user interface includes:
controls enabling a person viewing the display to select a tooth position or orientation
parameter to be changed that includes a plurality of controls, one associated with
each of the tooth angles of torque, tip and rotation, for respectively selecting
torque, tip and rotation angles of the tooth for change.

108.(New) The system of claim 99 wherein the graphical user interface includes:
a control enabling a person viewing the display to select a direction in which the tooth is
to be translated.

109.(New) The system of claim 99 wherein the graphical user interface includes:
a control enabling a person viewing the display to select a direction in which the tooth is
to be translated for adjusting tooth height.

110.(New) The system of claim 99 wherein the graphical user interface includes:
a moveable control enabling a person viewing the display, in relation to the movement
thereof, to move a tooth.

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